The Lena River Delta Observatory, Arctic Siberia: a Contribution to the ESA DUE Permafrost Project

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The major task of the ESA Data User Element DUE PERMAFROST is to develop and use Earth Observation services specifically for monitoring and modelling of permafrost. In order to setup the required information services, a target area approach with specified case study regions is used.

Long-term ground data series and multidisciplinary ongoing projects make the Lena River delta (Arctic Siberia) a prime study region for evaluation and validation of the DUE PERMAFROST remote sensing products. The Lena River Delta located in the zone of continuous permafrost is a key region for Arctic system science. Since 1998, the Alfred Wegener Institute for Polar and Marine Research AWI in collaboration with the Lena Delta Reserve in Tiksi has operated the German-Russian research station Samoylov. Relevant ground-based data (air temperature, radiation, snow, albedo, soil temperature and moisture) are collected continuously. The high landscape heterogeneity (wet polygonal centres, dry polygonal rims, ponds and lakes) challenges all ground data observations.

Match-up data sets of ground data and remote sensing products coincident in time and location are being built up. Exclusion and selection criteria will be based on experience, especially the knowledge on parameter variability in time and space. The main focus are the remote sensing products 'surface temperature', 'surface moisture', 'albedo', 'vegetation' and 'water'. Statistical and contextural methods will be used for the upscaling from the plot to the meso-scale. Problems will have to be identified such as process-dependent scales and the water body ratio within the pixel.